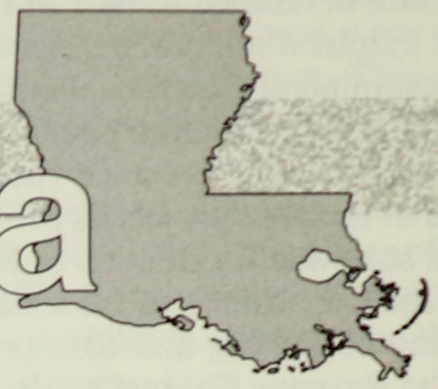
Louisiana



Statewide coordination of geographic information and GIS in Louisiana is achieved by three individual groups, including a GIS Task Force established in 1989, and a Land Information Advisory Board and a GIS Study Commission, both established by the Legislature in 1991. The GIS Task Force includes representatives of over 12 agencies and was initiated by the Louisiana Water Resources Information Center, located in the Department of Transportation and Development (DOTD). Leaders of 11 agencies, the Attorney General's Office, the House and Senate signed an agreement in 1989 regarding GIS, and the Task Force was officially recognized by Legislative resolution in 1990. The Land Information Advisory Board was created to lead and assist in the implementation of land information mapping and records systems, particularly at the local level. The Study Commission is focusing its efforts on specific issues related to GIS including access, cost recovery and open records. It was directed to develop recommendations and to draft legislation in this regard for consideration by the 1992 legislature.

Coordination efforts are also underway at Louisiana State University (LSU), which has a Remote Sensing and GIS Coordinating Council. LSU is working with the Task Force to propose that a state GIS Clearinghouse be established at LSU. Louisiana's GIS efforts are primarily located in DOTD and the Department of Natural Resources' (DNR). Recent GIS efforts in DNR have been funded by the federal Department of Energy to develop a statewide Louisiana Energy Information System. In addition, DNR's Louisiana Geological Survey is developing the Louisiana Coastal GIS Network located at and in coordination with LSU, with funding from the U.S. Geological Survey.

1 Origins of State Initiatives

GIS efforts in Louisiana began in the Department of Natural Resources' (DNR) Coastal Management Division (CMD) in the late 1970s as a result of the passage of Louisiana's State and Local Coastal Resources Management Act of 1978 (Act 361). The division administers the Coastal Resources Program for which a GIS feasibility study was conducted by Louisiana State University's (LSU) Engineering Research Department in 1978. The act provides the regulatory mechanism by which competing and conflicting uses of coastal resources could be coordinated by state and local governments. Following additional planning and on-line access with the U.S. Fish and Wildlife Service, CMD began implementation of its own

system to support the permitting process in 1985. The system has continued in operation since that time.

The Department of Transportation and Development (DOTD) initiated the use of its computer-aided mapping system in the early 1980s, followed by the Louisiana Geological Survey. DOTD's Louisiana Water Resources Information Center (LAWRIC) was created by the legislature in 1983 "to implement an indexing and data accessing system" for all water and water-related resource data collected by federal, state and local agencies.

Statewide geographic information coordination activities were initiated in 1988. DOTD's LAWRIC director sponsored a meeting of state agency representatives to discuss the need for a State Geographic Information Center on December 13, 1988. Following this meeting, a task force for a Statewide GIS Network, known as the GIS Task Force, was initiated, with an Executive Committee which includes representatives from the legislative as well as the executive branch of state government, including independently elected officials.

The Task Force's initial efforts were intentionally limited in focus to state government. While an Executive Order was considered, it was decided that a memorandum of understanding (MOU) would be the best instrument to meet this goal as the order would only influence the executive branch. Participants in the task force then worked within their agencies to develop and obtain support for an MOU that all could support.

Accordingly, an MOU was prepared and signed by the secretary or top executive of 11 state agencies, the Attorney General, and leaders of the Senate and House of Representatives, effective December 1, 1989. The MOU was established to develop a coordinated approach to GRI, including establishing goals to work together to inventory GRI activities, and identifying and evaluating the organizational structures or means for implementing a GIS plan (see **Coordination Efforts, Groups and Activities** and **Documents Excerpts**).

After the MOU was approved, task force efforts concentrated on completing the *State of Louisiana GIS Strategic Plan*, prepared in 1989. A position paper describing the justification, feasibility and recommended implementation of the plan was also initiated with the idea that it could be presented for approval to agency leaders, and if appropriate, the governor and legislature. The task force also began discussions with representatives of the academic community, and planned to later involve local governments and federal agencies. GIS activities at Louisiana State University (LSU) were accelerating at the same time. LSU created a Remote Sensing and GIS Coordinating Council in 1989 to encourage and facilitate interdisciplinary research and use of laboratories at the university, promote internal coordination, and work with and help educate state and local governments.

While these coordinating initiatives were underway, GIS activities within state agencies, particularly the Department of Natural Resources (DNR) grew significantly in 1989. For example, DNR's Energy Division received a grant from the Federal Department of Energy to develop a statewide emergency energy plan known as the Louisiana Energy Information System (LEIS). The Louisiana Geological Survey (LGS), which is administered by the DNR, and located at Louisiana State University (LSU), began a five-year program in 1989 to develop the "Louisiana Coastal GIS Network" (LCGISN) with LSU. This project received funding support from the U.S. Geological Survey's Geologic Division.

In 1989, a bill was enacted to require the Department of Natural Resources, Office of State Lands (the Office was later transferred to the Division of Administration) to establish standards for a statewide land information mapping and map records system. Efforts began to develop these draft standards later that year and were promulgated in October, 1991.

2 Coordination Efforts, Groups and Activities

Statewide coordination of geographically referenced information (GRI) has been coordinated by the Task Force for a Statewide GIS Network, or the GIS Task Force since 1989. In 1991, the Legislature also established a Land Information Advisory Board and a GIS Study Commission to address aspects of geographic information.

The GIS Task Force originated with the efforts of the manager of the Louisiana Water Resources Information Center (LAWRIC), located in the Department of Transportation and Development. LAWRIC was created by the legislature in 1983 "to implement an indexing and data accessing system" for all water and water-related resource data collected by federal, state and local agencies. LAWRIC has four computer files to index water data collected in the state, including the Water Data File, the Projects in Progress File, the Bibliographic File, and the Geographic Referencing File. LAWRIC serves as an indexing and referral service, and publishes a directory that includes information about water data sets and projects. LAWRIC has an advisory committee with members from state agencies, the Board of Regents,

and the state's Chemical Association and Engineering Society.

The 1990 Resolution officially acknowledged that leaders of all three branches of state government including 11 state agencies, the Attorney General, the House of Representatives and the Senate signed a memorandum of understanding effective December 1, 1989.

A formal GIS Task Force was officially established by the Legislature in 1990 with the passage of Resolution No. 171. It states that GIS services have become "an important economic development tool for states and local governments," and that the technology has a variety of other applications in land use and natural resource planning, transportation and social service delivery. It further states that "a strategic plan and uniform standards for GIS/GRI must be developed and a needs analysis and a cost/benefit study must be performed to ascertain the needs and requirements of the state and its local governments in the development, maintenance, and use of such information systems" prior to the creation of a Louisiana GIS Network. The Resolution requested the Division of Administration to attempt to secure federal funds for Task Force purposes.

Members of the GIS Task Force's Executive Committee include representatives of the Department of Culture, Recreation and Tourism; the Department of Economic Development; the Department of Agriculture and Forestry; the Department of Health and Hospitals; the Military Department of the Governor's Office; the Department of Natural Resources; the Department of Environmental Quality; the Department of Wildlife and Fisheries; the Department of Public Safety and Corrections; the Department of Transportation and Development; the Department of Justice; and the Division of Administration of the Governor's Office. The Division of Administration's Executive Committee members include representatives of the Office of Information Services, the State Planning Office and the State Land Office. In addition, the Louisiana Senate and the House of Representatives have members on the task force. The manager of the LAWRIC is the chair of the task force.

The 1990 Resolution officially acknowledged that leaders of all three branches of state government including 12 state agencies, the Attorney General, the House of Representatives and the Senate signed a memorandum of understanding (MOU) effective December 1, 1989. In 1990 the Office of Emergency Preparedness was transferred from the Department of Safety and Corrections to the Military Department (National Guard) of the Office of the Governor. Therefore, the MOU was amended to add the Military Department in 1990. The task force worked to develop and solicit support for the MOU rather than other legal instruments so as to ensure that all of state government would be included in the effort. The MOU was established to develop an "efficient and effective method for the coordination, research and development, access to, and technical assistance of geographically related information within state government." It helped authorize the task force's efforts and served to establish consensus among state leaders regarding GRI.

Objectives of the MOU were to establish a method to "maintain a current inventory of GIS/GRI including data, hardware, software, producers, users, technical skills/expertise to be used throughout State Government; to coordinate research and development using developed standards/guidelines for the storage and handling of this inventory; identify research and application needs of State Government; provide these needs to researchers and provide methods for development of these applications; identify all providers and users; determine, identify and evaluate the organizational structures or means for implementing the State GIS plan; and develop a position paper (including feasibility) on justifying and recommending levels of implementation of a GIS plan to be presented for approval to the Department Heads or equivalent, and if appropriate, for the Department Heads to go forward to the Governor and/or Legislature."

In addition to the MOU, the task force concentrated its efforts on developing the *State of Louisiana GIS Strategic Plan*. Efforts during 1989 concentrated on refining this plan to meet goals and objectives similar to these called for by the MOU, as well as to "educate State Government in the use and benefits of GIS." Revised in April 1991, the plan included the following objectives with a listing and description of the steps necessary to meet each one, responsible entities, and expected dates of accomplishment:

1. Maintain a current inventory of GIS (and/or GRI) including but not limited to data, hardware, software, and technical skills/expertise.
2. Quantify the benefits of GIS and present and justify GIS to State Government.
3. Provide and/or share technical assistance/skills within State Government.

4. Provide and/or share GRI within State Government.

5. Develop suggested standard/guidelines for the storage and handling of GRI.

6. Identify research needs of State Government and provide these needs to researchers.

7. Identify GRI applications needs of State Government and provide methods for development of these applications.

8. Identify all providers and users in the GRI community and include/invite participation in the State system, as appropriate.

9. Determine, identify and evaluate the organizational structures or means for implementing the State GIS plan.

10. Develop a position paper (including feasibility) on justifying and recommending levels of implementation of a GIS plan presented for approval to the department heads or their equivalent, and if appropriate, for the department heads to go forward to the governor and legislature.

Three subcommittees were established in 1990 to inventory data sets and GIS capabilities, to determine immediate functional needs of state agencies, and to define the goals of a state Geographic Information Center. A survey was sent to all state agencies to develop the inventory, although the findings were not published. Progress on the objectives articulated in the plan, as well as the goals of the subcommittees have been limited due to lack of state resources for GIS coordination.

The task force is finalizing a "white paper" to justify creating a GIS network. Also, efforts are underway to conduct a cost benefit study to determine the benefit of developing such a network. The task force initially focused its efforts on state government, followed by involvement with the state's academic institutions, and will then include local governments and federal agencies.

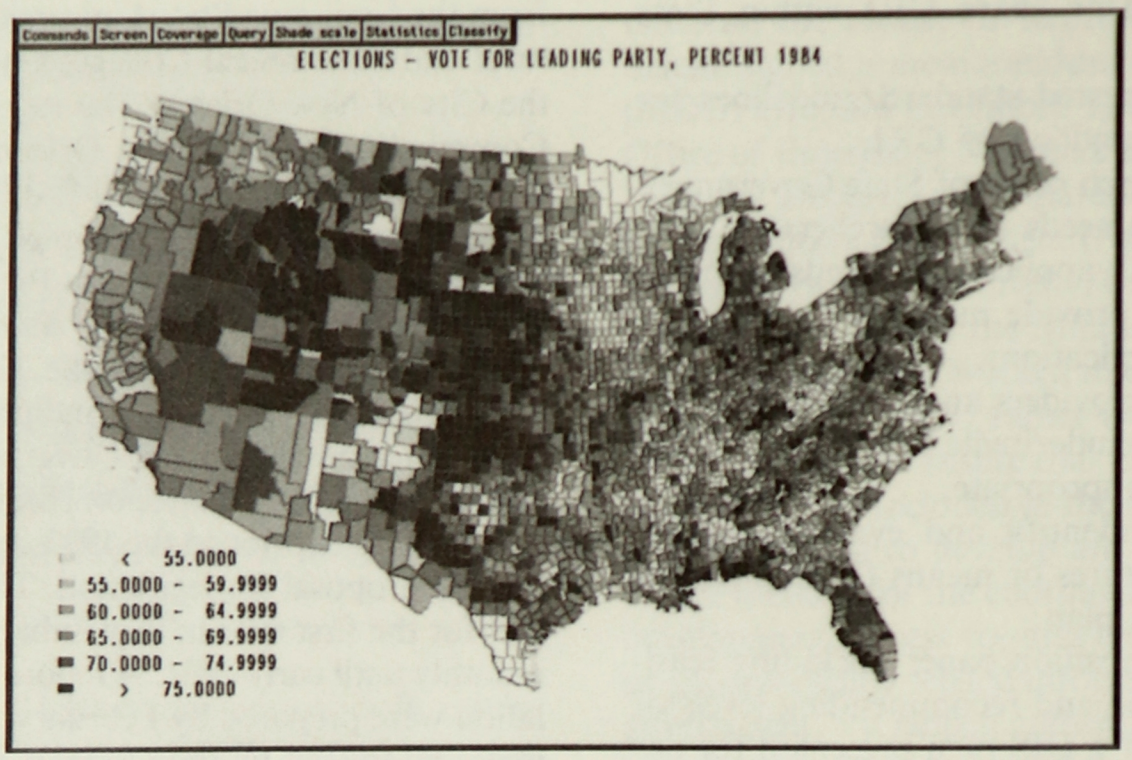
In addition to the task force, the Legislature established a Land Information Advisory Board and a GIS Study Commission in 1991 to address aspects of geographic information. The Commission was established by Senate Current Resolution No. 44 to study and make recommendations relative to GIS. The resolution was passed at the request of Calcasieu, Jefferson and Orleans Parishes to address specific issues related to GIS including access, cost recovery and open records.

The resolution specifies the membership of the commission with state government representatives including three members each from the Senate and House, the Attorney General or his designee, the director of the state archives or his designee, a representative of the office of state lands, and one representative from the State GIS Task Force. This representative is the chair of the task force. Additional members include one representative each from the Louisiana State University and Agricultural and Mechanical College; Calcasieu Parish; the City of New Orleans; the Regional Planning Commission for Jefferson, Orleans, St. Bernard and St. Tammany Parishes; the Consulting Engineers Council of Louisiana; the Louisiana Realtors Association; the Louisiana Press Association; and the Louisiana Assessors Association.

The resolution directed the Commission to make a written report of its findings to the Senate Committee on Senate and Governmental Affairs and the House Committee on House and Governmental Affairs prior to the 1992 session, with any specific proposal for legislation. The Commission met for the first time in September, 1991 and met monthly until early 1992. A report and draft legislation were prepared by February, 1992. Primary issues addressed by the Commission include access, cost recovery, open records liability exposure, and the distinction between products and services as they relate to GIS. The Commission worked with the State GIS Task Force, particularly as the Task Force was represented on the Commission. The Commission is expected to cease its efforts after it submitted its recommendations to the Legislature in 1992.

The Legislature also created a Land Information Advisory Board in 1991 through R.S. 50:172 -174. The board was created to review and recommend standards for land information mapping and records systems, develop criteria and guidelines for financial aid to parish (county) governments or assessors to implement such systems, review and recommend approval of parish implementation plans and projects for such systems, identify and study possible program revenue sources for the develop of such systems, and inform the Office of State Lands of the need for additional standards. This statute also mandates that the Office of State Lands provide technical assistance and advice to local governmental units and assessors regarding land information mapping and records systems and standards (see Local Government Efforts and Standards).

Members of the Advisory Board include the state public lands administrator, one representative of state agencies selected by the Governor, a representative of a major state university, and a parish or municipal employee. The one state agency representative is the chair of the GIS Task Force, who was also represented on the GIS Study Commission. Other members include representatives of the State Assessors Association, Louisiana Police Jury Association, Louisiana Clerks of Court Association, the private practice division of the Louisiana Engineering Society, and the Louisiana Municipal Association.



The board had its first meeting in September, 1991 and is meeting monthly. In the short term it will be focusing on developing recommendations on how to fund land information mapping and records systems in localities. The original bill provided for funding to be generated by an increase in the fee for recording land conveyances and mortgage instruments, however this funding component was eliminated from the bill before it was passed. The board will consider various funding options to create seed funding to encourage parishes and local tax assessors to implement land information mapping and records systems. In the long run it is anticipated the board will be responsible for additional duties prescribed in the statute.

In addition to these state government directed coordination efforts, Louisiana State University (LSU) is implementing interdepartmental coordination, including the 1989 organization of its Remote Sensing and GIS Coordinating Council. The goals of the council are to encourage and facilitate interdisciplinary research using all of the laboratories at the university, to promote internal coordination, and to work with and help educate state and local governments.

In keeping with the task force's plan to work more closely with academic institutions and in recognition of staff resource needs, the task force asked LSU to assist state government by providing some staff support for task force needs. This request was made because the task force assumed that approval for a coordination position would take at least a year for approval and LSU could more easily hire its staff support. LSU previously had a graduate student assisting its Coordinating Council, later deciding to make this position full-time. Accordingly, LSU hired a GIS Coordinator in November, 1990 to help both LSU and the state's GIS coordination needs. In addition to supporting both groups, one of the position's roles was to assist in efforts to design and build a GIS clearinghouse for the state. The position was vacated in September, 1991 and the future status and funding of the coordinator is uncertain. Most of the task force's efforts have concentrated on the need for a clearinghouse and on determining the best organizational structure for the state's GRI and GIS activities.

LSU developed a proposal for a *GIS Information Clearinghouse* in March, 1991. Recognizing coordination activities in both state government and LSU, the proposal advises that the clearinghouse would improve access to GRI and facilitate information flow within Louisiana's GIS community. Objectives of the clearinghouse include serving as an information center for GIS users, acting as a catalyst for interdisciplinary research, supporting GIS development and access to GRI, and promoting Louisiana as a regional, national and international center of GIS expertise. The clearinghouse would be supported and operated as a joint effort by the universities and state agencies. It would operate similarly to a library, and would be interfaced with the Northwestern On-line Terminal Information System (NOTIS) that is being installed between university libraries. The proposal calls for the clearinghouse to include four professional staff members, including director, coordinator, telecommunications specialist and library information specialist. Funding would be provided by both the state and the university.

State agencies working in the task force have in concept approved the clearinghouse. Efforts are being made to have state agency leaders sign a resolution indicating such support. It is expected that LSU will use this resolution to assist in

obtaining support for the budget request from the legislature.

In addition to these efforts by Louisiana's GIS Task Force with LSU, other initiatives are serving to improve the coordination and development of GRI in the state. The Louisiana Coastal GIS Network (LCGISN) has a Management Council, formed by the Louisiana Geological Survey in 1989 at the start of its project. The council includes university leaders, state agency representatives that include the chair of the State GIS Task Force and the manager of the Department of Natural Resources' Coastal Management Division's GIS; and federal agencies including USGS, the U.S. Army Corps of Engineers, and the U.S. Fish and Wildlife Service. It is chaired by a Research Geologist at the Louisiana Geological Survey located at Louisiana State University. LCGISN is also supported by two advisory groups, Coastal Users and Technical/Applications. It is anticipated that LCGISN will be a model for other groups sharing digital data for use with GIS, as well as a model for other states by the U.S. Geological Survey.

In addition, state agencies participate in the Gulf of Mexico Program sponsored by the U.S. Environmental Protection Agency (EPA) which addresses the environmental influences on the Gulf.

Local Government Standards and Efforts

In 1989 and 1991 the Legislature adopted bills providing for technical assistance and standards for localities regarding land information mapping and records systems. The Legislature's 1989 statute R.S. 50:171 required the Department of Natural Resources, Office of State Lands (later transferred to the Division of Administration) to "establish, promulgate, and maintain appropriate standards for a statewide land information mapping and map records system of all lands, private and public, within the state of Louisiana to promote and ensure compatibility, uniformity, and cost-effectiveness by public entities." The bill stipulated that the standards should include appropriate photogrametric or electronic mapping techniques and procedures to efficiently accommodate land information collection, maintenance, sharing, and retrieval. It further required the standards be used by every parish developing a land information mapping and map records system so as to assure that a complete list of all taxable property is developed. According to the bill, only those parishes meeting this requirement would be eligible for state financial aid.

The statute required that the rules be adopted prior to January 1, 1991, and the Office of State Lands hired Gulf South Engineers to have the draft standards prepared for the state. A draft entitled *Louisiana Land Information Mapping and Map Records System Standards* was completed in February 1991, but implementation has been delayed since funding was not appropriated for this effort. The October 1991 standards affect parcel level mapping and surveying accuracy, and are intended to be used by parish assessors for property tax purposes.

In 1991 the Legislature adopted a bill which established a Land Information Advisory Board (see above) and directed that the Division of Administration's Office of State Lands provide technical assistance and advice to local governmental units and assessors in the development of land information mapping and records systems, and the implementation of state standards established under R.S. 50:171, adopted in 1989 (see above). It also establishes that the State Lands Office has authority to promulgate and adopt additional and modify standards as appropriate.

This statute also provides that parish land information mapping and records systems programs, and land information offices may be initiated by parish governments or the parish office of the assessor. It specifies that the duties of the office shall include coordination of land information projects within the parish among all entities of government and the private sector, establishment of a land information systems user committee, identification of revenue sources for development and maintenance of the land information mapping and records system, prepare an implementation plan, and apply for state financial aid when available from the State Lands Office. It is anticipated that one of the primary activities of the board will be to make recommendations to establish funding for land information efforts at the local level (see above).

The National Geodetic Survey has a pilot project with Orleans, Jefferson and Calcsieu Parishes. These projects are using GPS to help evaluate the need for flood insurance, and are evolving to begin development of parcel level mapping.

3 GIS in State Government

Louisiana's GIS efforts are primarily located in the **Department of Natural Resources** (DNR), with activities underway since 1978. In 1990, it initiated a department-wide committee, the Interdepartmental GIS Task Force, after DNR decided to use GIS as part of the state's effort to create the Louisiana Energy Emergency Plan (LEEP).

As part of the plan, DNR received a grant from the U.S. Department of Energy in 1989 to develop a statewide Louisiana Energy Information System

(LEIS). Funding was provided from the Petroleum Violation Escrow Fund, which includes monies paid by oil companies for overcharging customers. The U.S. Department of Energy is using Louisiana's efforts as a role model for other states. The effort was initiated in response to the sharp escalation of the price of energy; physical destruction caused by hurricanes, tornadoes, floods, earthquakes, and other phenomena; a national security emergency; and a mobilization of defense resources creating a sudden surge in demand for energy.

The **Energy Division** is the agency within DNR that is responsible for federal energy planning and conservation programs. The division is responsible for overall development of the plan and that of related GIS efforts. The plan has two distinct parts. The first part addresses emergency response, and will be administered by the state's Office of Emergency Preparedness. The second part concerns economic response, and will provide comprehensive economic forecasting and modeling of the state's energy activities by tracking and inventorying crude and refined products.

The total project funding is approximately $6.5 million over the three-year term ending September, 1992. A GIS laboratory was established in DNR to help develop and implement the plan. Six professional staff members have been working on GIS in the Energy Division. An analysis is underway to change GIS conditions in the division.

The system consists of a network built around the Data General AViion file server and supporting 18 workstations, with InfoCAD software from Digital Matrix Systems, Inc. MOSS and ERDAS software are also being used. DNR is a beta test site for InfoCAD. Plans being implemented ensure that each individual parish remains continuously on-line with DNR's host computer.

LEEP's goals have been development of a database consisting of energy-related information to be used by DNR, other state agencies, and parish governments to monitor, analyze and plan for energy emergencies. The agencies will also be able to demarcate data needs for monitoring energy supply and disposition for use in forecasting models; determine conservation indexes and indicators for identifying impending shortages and response capabilities; and employ special monitoring procedures for emergencies. Data development efforts include creating a 1:24,000 scale digital database for the entire state that includes all data on U.S. Geological Survey (USGS) quadrangle maps as a base for the effort. Data development activities were conducted both in-house and under contract.

DNR's **Coastal Management Division** (CMD) initiated the first use of GIS in Louisiana's state government as a result of the passage of Louisiana's State and Local Coastal Resources Management Act of 1978 (Act 361). Louisiana's coastal wetlands cover approximately nine million acres, and are the largest and most productive estuarine complex in North America. Louisiana has 40% of the nation's wetlands within its boundaries, and provides 30% of the nation's commercial fish and shellfish harvest. The act provided the regulatory mechanism by which competing and conflicting uses of coastal resources can be coordinated by state and local governments. Guidelines developed under the act serve as enforceable criteria for the granting, conditioning, denying, revoking or modification of coastal use permits.

The Coastal GIS has from the start been funded by the state. Since 1978, CMD's investment has been approximately $2.5 million in equipment, data, contracts and personnel. The division uses MOSS and ERDAS software on a Data General super mini-computer for GIS and image processing work. The system is currently being integrated with the department-wide GIS network led by the Energy Division.

The coastal GIS provides wetland managers, regulators, and researchers with geographic data. The system was originally designed and continues to support the review of permit applications for individual sites, regional analyses for parishes, and analyses for the entire coastal area. The system provides information on wetland land cover and land use changes over time with detailed vegetation cover and locations of environmentally and culturally sensitive features.

The **Louisiana Geological Survey** (LGS) is administered by the DNR, and is located at both DNR and Louisiana State University (LSU). LGS began a five-year program in 1989 funded by the USGS' Geologic Division which is developing the Louisiana Coastal GIS Network (LCGISN) located at LSU. Louisiana is well known for its severe coastal erosion and wetland loss, and LCGISN was initiated to address the need for coastal information that will help to assess the potential risk these changes pose to Louisiana's citizens. The initial purpose of the project is to assess and monitor coastal change, including barrier island erosion and wetland loss. LCGISN will later produce "one of the country's largest multidisciplinary and multifaceted wetlands databases." The project is being considered by the USGS Geologic Division as a prototype for other states, and by state government as a pilot project for the sharing of GIS data.

The LCGISN Management Council, was formed and chaired by LGS at the start of its project. The council includes state and federal agency representatives, among others. LCGISN also has two advisory groups named Coastal

Users and Technical/Applications to provide input. LCGISN's annual budget is funded by USGS and is approximately $200,000 per year, with five staff members and additional student assistance. Efforts are also underway to acquire funding support from foundations for cataloging work. Much of the work is being conducted by LSU's faculty and laboratories. It has SUN and Intergraph workstations with ARC/INFO, Intergraph, and access to Infocad software to facilitate data transfer with the Energy Division's GIS efforts.

Following an analysis of project needs, the first priority was determined by the project, a spatial data index/bibliography. The project includes interfacing existing and future GIS activities with a cataloging, indexing, dissemination and distribution system to develop a coastal map library with future on-line access. LCGISN is expected to provide access to available geographic information for different types of data media, including maps, imagery, photos, video, textual, and others. A prototype user interface was designed, tested and refined using Hypercard running on a Macintosh computer.

The **Department of Environmental Quality** (DEQ) has adopted GIS as an agency-wide program goal, and is including GIS in the agency's Information Systems Management Project. DEQ's Ground Water Protection Division initiated the agency's first GIS effort. It conducted a prototype pilot project funded under the Wellhead Protection Program of the U.S. Environmental Protection Agency (EPA) which inventoried and evaluated potential contamination sources around public drinking water wells in a defined area. This project was conducted with Louisiana State University.

Approximately $225,000 in state and federal funds were used to purchase DEC workstations and ARC/INFO software. Additional staff resources are being allocated. The system will be linked to DEQ's ORACLE database management system.

The **Division of Administration** (DOA) is informally developing an agency-wide approach to GIS with a group that reports to the Assistant Commissioner for Information Resources. DOA includes the Office of Information Services, the State Planning Office, the State Land Office and the State Census Data Center. The Office of Information Services provides data processing, telecommunications services, and planning for the state. It has not been involved directly in GIS, but is monitoring and assisting in statewide GRI coordination efforts through participation in the GIS Task Force. It may have a stronger role in GIS in the future after Census Bureau TIGER data becomes available.

DOA's **State Land Office** is responsible for managing state-owned lands and minerals leasing. According to legislation approved in 1989 and 1991, it is developing state standards for parcel level mapping and is directed to provide technical assistance to localities in the development of land information mapping and records systems, and the implementation of standards. However, funding has not been made available for this assistance (see **Coordination Efforts, Groups and Activities**). In addition, a pilot project was conducted in 1990 in St. Mary's Parish with LSU's Remote Sensing Laboratory to identify state-owned property and lands where additional revenue may need to be collected. The project included natural and physical resources and related activity for this area including information in existing automated and manual databases, and USGS quadrangle sheets and Census Bureau TIGER files. LSU facilities were used for the state lands prototype. In addition to this project, DNR funded and placed GIS hardware and software in the Land Office to enable state land boundaries and other data to be digitized as input for DNR's system. The Land Office will access DNR data as needed to meet its needs.

The **Military Department**'s Office of Emergency Preparedness is using data from the federal Weather Service and can access meteorological data using the Enhanced Graphic Decision System (ENHGDS). It will be using the Federal Emergency Management Agency's (FEMA) Integrated Emergency Management Information System (IEMIS). The system will also be networked with the InfoCAD system located in DNR, since the Emergency Preparedness Office has related responsibilities.

The **Department of Economic Development** is undergoing reorganization that will potentially result in GIS implementation in the agency. It is working with electric utilities in the state to improve site selection assistance for new industrial and commercial businesses. As economic development is one of the major goals of the governor, efforts are being made to acquire additional funds for GIS. The department is using quadrangle and census maps with EPPL7 software purchased from the state of Minnesota's Land Management Information Center. Louisiana has over 1,500 enterprise zones, and will be using Census Bureau TIGER line files to assist in the management of this program. ATLAS-Graphics software will be used on a network for GIS.

The **Department of Transportation and Development** (DOTD) has a large CAD system for drafting and some mapping needs. It is used

department-wide, with Intergraph software on 14 workstations. It displays the location of highways and bridges, as well as providing specific information about them. The system is used to produce information for district offices, including a map that divides the highway network's needs into categories and tabular summaries. The system was also used to achieve successful results in an election for approving an increase in gasoline taxes and dedication of that revenue for improved transportation facilities. The system also helped officials develop a $1.4 billion transportation improvement program to assist in economic development. DOTD spends almost $100,000 per year on the GIS part of the system, 57% of which is state funded. The equivalent of approximately four staff positions are allocated for GIS work.

Within the DOTD is the Louisiana Water Resources Information Center (LAWRIC), created by the legislature in 1983 "to implement an indexing and data accessing system" for all water and water-related resource data collected by federal, state and local agencies. Although the center does not use GIS, LAWRIC has four computer files to index water data collected in the state, including the Water Data File, the Projects in Progress File, the Bibliographic File, and the Geographic Referencing File. LAWRIC serves as an indexing and referral service for information about water data sets and projects. LAWRIC published a *Louisiana Water Data Referral Directory*, in March, 1988 that includes information about tabular water data sets and projects available from nine state and six federal agencies. LAWRIC's manager is chair of Louisiana's GIS Task Force, was represented on the state's GIS Study Commission and represents state agencies on the State Land Information Advisory Board (see **Coordination Efforts, Groups and Activities**).

In addition to its in-house activities, the *Spatial Information and Modeling System for Transportation* (SIMST) project was initiated in July, 1989 to create new and efficient mapping and spatial analysis methodologies. The two-year project is being conducted by LSU's Remote Sensing and Image Processing Laboratory, with funding from the Federal Highway Administration (FHWA). SIMST evaluates new digital mapping sources for highway data and created a set of software tools that manage the elements composed in a spatial database. The project's purposes are to ease the burden of integrating the diverse and disperse data sets potentially used with GIS and to apply technology to the problem of maintaining a current spatial base map. The first year of the project gathered data via GPS, satellite imagery, aerial photography, and federal digital databases, and then assessed them for DOTD needs. Demonstrations help test the use of these sources for highway needs, pavement management, and storm discharge applications. The second year of the project includes investigation of data gathered with vans that have GPS receivers. A 49 square mile portion of Beauregard Parish is the demonstration county for the SIMST project. The project was scheduled to be completed in 1992.

Louisiana is a test state for the related *Application of the Global Positioning System (GPS) for Transportation Planning* project being conducted by Ohio State University with FHWA and other state departments of transportation for digital transportation data development (see Ohio profile). LSU is also collecting GPS data through Navstar Mapping Corporation.

The **House Office of Legislative Services** and the **Senate Legislative Staff** are using GIS in-house to support reapportionment activities. DEC workstations have been installed with specialized software for reapportionment.

Academic Activities

Louisiana State University (LSU) is creating a Regional Center for Remote Sensing and GIS. The university has a **Remote Sensing and GIS Coordinating Council** that was formed in 1989. The purpose of the council is to encourage and facilitate interdisciplinary research using all of the laboratories at the university, to promote internal coordination, and to work with and help educate state and local governments.

LSU has four laboratories, including the Computer Aided Design-GIS Laboratory, the Remote Sensing and Image Processing Laboratory, the Earth Scan Laboratory, and the Louisiana Agricultural Decision Support System and Knowledge-Based System Development Laboratory. Activities involve ten academic departments and over 50 faculty and staff, with an equivalent of approximately 16 full-time staff. LSU has had a GIS coordinator to satisfy both LSU's GIS coordinating needs and those of the state, though this position was vacated in September, 1991 (see **Coordination Efforts, Groups and Activities**). A variety of hardware and software is in use, including ARC/INFO, Intergraph, and Trimble Pathfinder for GPS. LSU is working with various state and federal agencies on the Louisiana Energy Information System and the Louisiana Coastal GIS Network with the Department of Natural Resources, as well as completing the *Spatial Information and Modeling System for Transportation* project with the Department of Transportation and Development (see **GIS in State Government**).

4 Documents List

Directives

Louisiana Revised Statute 50:172 -174, **Relative to Land Information and Records System, Creation of Land Information Advisory Board, Standards, and Parish Land Information Offices**, 1991.

This statute provides that the Division of Administration's Office of State Lands shall provide technical assistance and advice to local governmental units and assessors in the development of land information mapping and records systems, and the implementation of state standards established under R.S. 50:171 (see below). A Land Information Advisory Board is created to review and recommend standards for land information mapping and records systems, develop criteria and guidelines for financial aid to parish (county) governments or assessors to implement such systems, review and recommend approval of parish implementation plans and projects for such systems, identify and study possible program revenue sources for the develop of such systems, and inform the office of state lands of the need for additional standards. Members of the board include the state public lands administrator, one representative of state agencies selected by the governor, a representative of a major state university, and a parish or municipal employee. Other members include representatives of the State Assessor's Association, Louisiana Police Jury Association, Louisiana Clerks of Court Association, the private practice division of the Louisiana Engineering Society, and the Louisiana Municipal Association.

The statute also establishes that the office of state lands has authority to promulgate and adopt additional and modify standards as appropriate. It also provides that parish land information mapping and records systems programs and land information offices may be initiated by parish governments or the parish office of the assessor. It specifies that the duties of the office shall include coordination of land information projects within the parish among all entities of government and the private sector, establishment of a land information systems user committee, identification of revenue sources for development and maintenance of the land information mapping and records system, prepare an implementation plan, and apply for state financial aid when available from the State Lands Office.

Louisiana Senate Current Resolution No. 44, **To Create the GIS Study Commission**, 1991.

This resolution creates the GIS Study Commission to study and make recommendations relative to GIS. The resolution specifies the membership of the commission with state government representatives including three members each from the Senate and House, the attorney general or his designee, the director of the state archives or his designee, a representative of the office of state lands, and one representative from the State GIS Task Force.

Additional members include one representative each from the Louisiana State University and Agricultural and Mechanical College; Calcasieu Parish; the City of New Orleans; the Regional Planning Commission for Jefferson, Orleans, St. Bernard and St. Tammany Parishes; the Consulting Engineers Council of Louisiana; the Louisiana Realtors Association; the Louisiana Press Association; and the Louisiana Assessor's Association. The resolution directs that the Commission make a written report of its findings to the Senate Committee on Senate and Governmental Affairs and the House Committee on House and Governmental Affairs prior to the 1992 session, including any specific proposal for legislation.

Louisiana House Concurrent Resolution No. 171, **To Recognize the Task Force for a Louisiana GIS Network**, 1990.

This two-page resolution was adopted to recognize the task force as a Louisiana GIS Network and to "urge and request the division of administration to attempt to secure federal funds for the purposes of said task force." It states that GIS applications have become "an important economic development tool for states and local governments by allowing them to better monitor and maintain their infrastructure resources . . . *and* other applications of both GIS and geographically related information (GRI) exist, ranging from land use and natural resource planning to transportation and social service delivery." The resolution acknowledges that 11 state agencies, the House of Representatives, and the Senate signed a memorandum of understanding which formed the task force for a Louisiana GIS Network. It further states that a "a strategic plan and uniform standards for GIS/GRI must be developed and a needs analysis and a cost/benefit study must be performed to ascertain the needs and requirements of the state and its local governments in the development, maintenance, and use of such information systems" prior to the creation of a Louisiana GIS Network.

Louisiana Revised Statute 50:171, **Establishing Standards for a Statewide Land Information Mapping and Map Records System**, 1989.

This two-page statute was enacted to require that the Department of Natural Resources, Office

of State Lands (later transferred to the Division of Administration) "establish, promulgate, and maintain appropriate standards for a statewide land information mapping and map records system of all lands, private and public, within the state of Louisiana to promote and ensure compatibility, uniformity, and cost-effectiveness by public entities. These standards shall be developed to include the establishment of appropriate photogrametric or electronic mapping techniques and procedures which efficiently accommodate land information collection, maintenance, sharing, and retrieval." The statute also states that the standards "shall be employed by every parish governing authority or tax assessor undertaking the development of a land information mapping and map records system to assure that the assessment rolls of the parish contain a complete list of all taxable property. Only parish and tax assessor land information mapping and map records systems complying with these standards shall be eligible for state financial aid." The statute states that "department shall adopt these standards by rules adopted . . . prior to January 1, 1991."

Louisiana Revised Statute 38:91, **Creation of the Louisiana Water Resources Information Center**, 1983.

This one-page statute states that the "Department of Transportation and Development, Office of Public Works is hereby directed to establish and create a Louisiana Water Resources Information Center . . . and to implement an indexing and data accessing system which will contain, in part, all information past, present and future for water and water related resource data so collected by federal, state, and local agencies in the state of Louisiana." It also states that the Center "shall promulgate rules necessary to develop a program that will index or access all water related resources data . . . to serve as a central access point for all Louisiana water data, making said data more available, thereby reducing duplication of collection of said water data and increasing its use."

Memorandum of Understanding

This Memorandum of Understanding acts to establish "an efficient and effective method for the coordination, research and development, access to, and technical assistance of geographically related information within state government," including Louisiana state agencies, legislature, and Attorney General, December 1, 1989, and amended.

This Memorandum of Understanding was signed by leaders of the Senate, House of Representatives, 12 state agencies, and the Attorney General. Objectives include maintaining an inventory of GIS/Geographically Referenced Information (GRI) including data, hardware, software, producers, users, technical skills/expertise to be used throughout State Government; coordinating research and development using developed standards/guidelines for the storage and handling of this inventory; identifying research and application needs of State Government; providing these needs to researchers and provide methods for development of these applications; identifying all providers and users; determining, identifying and evaluating the organizational structures or means for implementing the State GIS plan; and developing a position paper (including feasibility) on justifying and recommending levels of implementation of a GIS plan to be presented for approval to the Department Heads or equivalent, and if appropriate, for the Department Heads to go forward to the Governor and/or Legislature (see **Document Excerpts**).

Publications/Reports

State of Louisiana GIS Strategic Plan, GIS Task Force, April, 1991.

This plan was developed to help "establish an efficient and effective method for the coordination, research and development, access to and technical assistance of Geographically Related Information (GRI) within State Government (and to) educate State Government in the use and benefits of GIS." It includes ten objectives, with a listing and description of the steps necessary to meet each objective, responsible entities, and expected dates of accomplishment.

Louisiana Water Data Referral Directory, Louisiana Water Resources Information Center, (LAWRIC), March, 1988.

The Louisiana Water Resources Information Center (LAWRIC) is an indexing and referral service created by the legislature in 1983 which includes "all information past, present and future for water and water related resource data so collected by federal, state and local agencies in the state." It serves as a "central access point for all Louisiana water data" to reduce "duplication of collection of said water data and increasing its use." The LAWRIC Directory includes information about tabular water data sets and projects available from nine state and six federal agencies. It is categorized by agency, and provides information about tabular databases that includes contacts, name, purpose, software to manipulate data, hardware, accessibility of data, data storage medium, data coverage, parameter descriptions, and time period and size of record. Agency projects during 1985 are also described. An index is included.

Papers

Louisiana Coastal GIS Network (LCGISN): Access to Spatial Data, McBride, Randolph A., et al., Louisiana Geological Survey, Meridian, 1991.

This paper asserts that "Louisiana is the nation's hot spot in terms of coastal erosion and wetland loss." It describes how these changes have immense environmental, economic, social, political, and public safety ramifications for the state and nation. The Louisiana Coastal GIS Network (LCGISN) was initiated to address the need for coastal information to assess the potential risk these ramifications pose to Louisiana's citizens. The Louisiana Geological Survey, the Louisiana State University (LSU) Department of Geography and Anthropology, the LSU CADGIS Research Laboratory and others, with funding from the U.S. Geological Survey, are developing LCGISN to provide access to geographic information available for different types of media. This information includes maps, imagery, photos, video, textual, and others. The paper describes the organizational structure for LCGISN, including the Management Council, network core group, and the technical GIS group. Two advisory groups, Coastal Users and Technical/Applications, also exist to provide input. The paper also includes a ranking of needed data sets for the project. A spatial index/bibliography was considered the most needed data set. A prototype user interface was designed, tested and refined using Hypercard running on a Macintosh computer. A network of workstations has been implemented, and LCGISN is expected to be fully functional by 1994.

Man at Risk in Louisiana's Coastal Zone—The Need for a Comprehensive GIS, Davis, Donald W., and Randolph A. McBride, CADGIS Research Laboratory and Louisiana Geological Survey, Louisiana State University, Proceedings of the Twelfth International Conference of the Coastal Society *Our Coastal Experience: Assessing the Past, Confronting the Future*, San Antonio, October 21-24, 1990.

This paper explains how GIS services are used in assessing and monitoring coastal change. Louisiana has 41% of the country's marsh ecosystems, and GIS agencies are serving as a coast-wide data management link. The paper describes how coastal areas are under stress in various areas of the country and world, particularly focusing on the coastal problems in the state of Louisiana. It describes a partnership approach developed between the U.S. Geological Survey and the Louisiana Geological Survey to establish the Louisiana Coastal GIS Network. The purpose of the program is to take the variety of available coastal information and consolidate it into an easily retrievable form, despite format, platform, software and method of storage. The project will focus on barrier islands and wetlands loss to produce "one of the country's largest multidisciplinary and multifaceted wetlands data bases." The project was initiated in 1989, and is expected to continue for five years.

Accurate Computer Mapping of Coastal Change: Bayou Lafourche Shoreline, McBride, Randolph A., Proceedings of Sixth Symposium on Coastal and Ocean Management, July 11-14, 1989, Charleston, South Carolina.

This paper describes how the Louisiana Geological Survey is monitoring rapidly changing coastlines using coastal base maps dating back to 1880. The Bayou Lafourche shoreline, located west of the Mississippi Delta, is an example of how maps from different sources have been compiled and analyzed using computer mapping. This paper documents the changes in this shoreline and the techniques used to draw conclusions about past changes.

Erosion and Deterioration of the Isles Dernieres Barrier Island Arc, Louisiana, U.S.A.: 1853 to 1988, McBride, Randolph A., et al., *Transactions—Gulf Coast Association of Geological Societies*, Volume XXXIX, 1989.

This paper reviews the cartographic and aerial photography data between 1853 and 1988 which were used to construct shoreline change maps of the Isles Dernieres Barrier Island. The Louisiana Geological Survey and the U.S. Geological Survey are investigating the processes that drive coastal erosion and land loss in Louisiana. Data from various sources were superimposed using computer mapping, which prevent inconsistencies. The rate of coastal land loss in Louisiana is expected to worsen, with the Isles Dernieres having some of the most rapidly deteriorating shoreline in the country. The paper reviews the method and results of the historic analysis using computer mapping.

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5 Document Excerpts

MEMORANDUM OF UNDERSTANDING

"Relating to the Establishment of an efficient and effective method for the coordination, research and development, access to, and technical assistance of geographically related information within state government," among the Senate, House of Representatives, Division of Administration, Departments of Agriculture and Forestry, Justice, Culture, Recreation and Tourism, Economic Development, Environmental Quality, Health and Hospitals, Military Affairs,

Natural Resources, Public Safety and Corrections, Transportation and Development, and Wildlife and Fisheries. (The MOU was signed on or before December 1, 1989 by the Secretary or Commissioner of each of these agencies, as well as the Secretary of the Senate, the Speaker of the House, and Attorney General).

WHEREAS, some Geographic Information System (hereinafter referred to as "GIS")/Geographically Related Information (hereinafter referred to as "GRI") data are being collected and computerized by each of the Parties; and

WHEREAS, each of the Parties is experiencing similar, if not identical, technical problems from collecting to computerizing the data; and

WHEREAS, the Parties are having difficulty identifying the availability and sources of GIS/GRI data and related resources; and

WHEREAS, the Parties recognize that it would be beneficial to cooperate by coordinating the sharing of GIS/GRI data, sharing technical skills from the collection to computerization of this data; and

THEREFORE, the Parties have reached the following understanding:

Article 1: Objectives

This MOU is undertaken to establish an efficient and effective method to maintain a current inventory of GIS/Geographically Referenced Information (GRI) including but not limited to data, hardware, software, technical skills/expertise to be used throughout State Government; to coordinate research and development using developed standards/guidelines for the storage and handling of this inventory; identify research and application needs of State Government; provide these needs to researchers and provide methods for development of these applications; identify all providers and users; determine, identify and evaluate the organizational structures or means for implementing the State GIS plan; and develop a position paper (including feasibility) on justifying and recommending levels of implementation of a GIS plan to be presented for approval to the Department Heads or equivalent, and if appropriate, for the Department Heads to go forward to the Governor and/or Legislature.

Article 2: Forms of Cooperation

The following cooperative activities may be undertaken:

a) Exchange of information, publications, reports, technical data, samples, materials, instruments, and components for test purposes, including data bases, computer codes, hardware, software and results and methods of research and development which will be specified in future Annexes to this Agreement;

b) Exchange visits by agency personnel and other specialists for participation in research and development activities relating to the furtherance of the objectives of the understanding which will be specified in future Annexes to this MOU;

c) Joint research projects, which may include cost sharing arrangements and/or arrangements for joint planning and/or joint project execution, which will be specified in future Annexes of this MOU.

Article 3: Subject Areas of Cooperation

Subject areas of cooperation may include:

a) Development of a GIS/GRI Data Base which will maximize compatibility with the agencies' hardware and software;

b) Access to this Data Base should be made available to all parties as allowed by law;

c) Research and development;

d) Technical skills/assistance;

e) Establishment of standards/guidelines;

f) Identify GIS/GRI applications, providers, and users;

g) Explain the benefits of GIS/GRI Data Base to State Government.

Article 4: Financial Conditions

No financial commitments are established initially in this MOU, and it is understood that participation by any Party in future specific activities shall be subject to the availability of funds. Those future specific activities requiring funding shall be equally cost-shared, or on such other basis as is agreed to by the Parties hereto in writing. The Parties shall set forth in each Annex to this MOU the financial terms and conditions, including the budget and the funding commitments of each Party, for the activities defined in the task agreement in each Annex. All other costs resulting from cooperation under this Mou shall be borne by the Party that incurs them.

Article 5: Third Party Involvement

The provisions of this MOU shall not affect the rights or obligations of any Party under its agreements or arrangements with other agencies, contractors, or individuals.

Article 6: Intellectual Property

Each annex to this MOU shall include appropriate intellectual property provisions which recognize the rights and equities of each Party consistent with applicable laws and regulations.

Article 7: Coordination

Each of the Parties may appoint representatives who will facilitate joint activities under this MOU, with the intention that there will be regular communication among the representatives to assist in the implementation of this MOU. An annual report of activities under the MOU will be prepared jointly by the representatives and submitted to the Parties and GIS Committee.

Article 8: Entry into Force and Duration

This MOU shall enter into force upon signature of all Parties, shall extend for a period of five years after the date of signature, and may be amended or extended by mutual written agreement of the Parties. Any Party may terminate this MOU by providing the other Parties with four months advance written notice. Any such termination shall be without prejudice to the rights which have accrued under this MOU to any Party up to the date of such termination."